APPENDIX H

COST ESTIMATE DATA

APPENDIX H

This appendix presents costing assumptions and rough order of magnitude (ROM) cost estimates for the ordnance and explosives (OE) response action alternatives proposed and evaluated in this Engineering Evaluation/Cost Analysis (EE/CA) report. The cost estimates provided in this appendix do not include the following: labor overhead rates, general and administrative (G&A) costs, profit margin (i.e., fee), and Hawai'i state excise tax. Additionally, the costs associated with U.S. Army Corps of Engineers (USACE) support (which may include, but not be limited to: awarding, managing, and overseeing the project; manning an on-site field office; and providing project management oversight and community relations support) are unknown at this time and therefore have not been included.

These ROM cost estimates are only intended for comparing costs associated with the proposed OE response action alternatives. They are not intended to represent actual costs of implementation. For OE response action alternatives that are clearances, costs were developed based on proven technologies, USACE procedures, and current methodologies for the clearance of surface and subsurface ordnance. Costs for services and materials provided in this ROM estimate were primarily developed from the level of effort costs associated with the recently conducted Phase II EE/CA field investigation (2001). Since these ROM estimates are based on 2001 dollar values, adding 2 to 3 percent for annual inflation may also be required in addition to the other associated costs mentioned above. The ROM costs provided in this appendix have been adjusted to account for an increase of six percent for inflation costs over the next 2 years to account for the time required to acquire funding and implement the recommended OE response actions. The ROM cost estimates are based on the amount of estimated growth for the project site, as described in the estimated growth projections from the *County of Hawai'i General Plan* (through the year 2020).

Costs have been estimated for three of the four OE response action alternatives evaluated in this EE/CA report. There are no cost estimates provided for Alternative 1 (No Action Indicated [NAI]), as there are no costs associated with NAI. The three OE response action alternatives are:

- Alternative 2 - Institutional Controls
- Alternative 3 - Surface Clearance of OE
- Alternative 4 - Subsurface Clearance of OE to Depth of Detection.

Any OE response actions that are implemented within the Former Waikoloa Maneuver Area and Nansay Sites as a result of this EE/CA will be conducted under direct guidance of the USACE.

Part I of this appendix provides costing assumptions and estimated costs associated with implementation of various types of Institutional Controls (Alternative 2), Surface Clearance of OE (Alternative 3), and Subsurface Clearance of OE to Depth of Detection (Alternative 4). The costing assumptions and cost estimate data provided in Part I are extrapolated to calculate ROM cost estimates in Part II and Part III. **Part II** of this appendix provides ROM cost estimates for each area evaluated (i.e., Areas A through T) using the Ordnance and Explosives Risk Impact Assessment (OERIA). These costs are used in Chapter 8.0 solely for comparative purposes to evaluate the four OE response action alternatives. **Part III** of this appendix

provides ROM cost estimates for OE response actions that are recommended (as a result of the evaluation in Chapter 4.0 and Chapter 8.0) for the Former Waikoloa Maneuver Area and Nansay Sites (Chapter 9.0). **Part IV** of this appendix provides practical solutions to reduce the costs associated with implementation of the recommended OE response actions.

PART I - COSTING ASSUMPTIONS AND ESTIMATED COSTS

INSTITUTIONAL CONTROLS (ALTERNATIVE 2)

Cost estimates for various types of Institutional Controls evaluated in this EE/CA report include the following: display case development and installation, warning sign development and installation (both on existing fences and metal posts), development and production of an OE safety awareness training video, development and distribution of notification letters to landowners, development and distribution of informational pamphlets, periodic community awareness meetings, and implementation of construction support.

- It is assumed that warning signs will either be placed on existing fences or installed on metal posts. Installation of fencing has not been evaluated (therefore, no costs are provided) in this EE/CA report. Opinions expressed during the EE/CA field investigation indicated that landowners and local agencies are unlikely to accept fencing as an acceptable OE response action. It is assumed that the terrain (i.e., rough a'a lava rock) will act as a natural barrier and deter public access in some areas. Other areas, because they are tourist attractions, would not be susceptible to barbed wire fencing (i.e., it would potentially deter tourists away from the area).

- Warning signs would be installed at 500-foot intervals along existing fences or on metal posts, as well as at each access point for roads entering areas having the potential for OE.

- The number of warning signs to be installed on existing fences is calculated using the linear distance (measured in feet) of the perimeter of each evaluation area (i.e., Areas A through T) divided into 500-foot increments and knowledge of major access points into each evaluation area.

- Costs include materials for replacement of 75 percent of the warning signs due to exposure to the elements and/or vandalism.

- Personnel for installation of warning signs on existing fences includes a USACE Contractor, project foreman, and one local laborer.

- Personnel for installation of warning signs on posts include an unexploded ordnance (UXO) Technician and a sign installation crew consisting of a project foreman and two local laborers.

- Cost for the display cases includes construction of the cases, design of the information graphics (i.e., posters), and installation of the display cases.

- Costs do not include periodic maintenance for the display cases since it is assumed that landowners and/or local agencies would perform long-term maintenance.

- Personnel for display case installation and set-up includes a UXO Technician, two USACE contractor personnel, and two local laborers.

- A hand-held metal detector will be used by the on-site UXO technician to assist in safe installation of the display cases and warning signs on posts.

- Resources and personnel required for development of an OE safety awareness training video includes: script development by USACE representatives and/or USACE contractor support personnel, video camera equipment rental, video camera operator, USACE contractor (acting as video narrator), a local laborer to assist with taping in the field, film editing, and tape duplication.

- It is assumed that the OE safety awareness training video will be produced on location over a 12-day period. The USACE contractor representative would travel the day before and after the training video is taped allowing for a total of 14 days. The video camera operator would be from the local area.

- It is assumed that 20,000 informational pamphlets will be developed for distribution to the general public (i.e., for placement as part of display cases). It is assumed that an additional 5,000 pamphlets will be handed out to local businesses and residents.

- Development of the informational pamphlets includes the production of a draft letter, artwork development, and review and comment by USACE project management and legal personnel.

- Personnel for distribution of informational pamphlets to the local communities include a USACE contractor and two local laborers.

- Development of the landowner notification letter includes the production of a draft letter and review and comment by USACE project management, real estate, and legal personnel.

- Two USACE contract personnel will identify all landowners within the Former Waikoloa Maneuver Area and Nansay Sites. Once identified, it is assumed that 9,000 notification letters will be mailed via certified United States mail to landowners within the Former Waikoloa Maneuver Area and Nansay Sites.

- Costs for community awareness meetings to be conducted every other month over a 5-year period (30 meetings total) have been provided. The USACE representative and/or the USACE contractor will present the project status to the community using poster boards and a PowerPoint slideshow.

- Community awareness meetings will be held in the evening to allow for increased public participation and will be videotaped by a local videographer.

- Personnel supporting the community awareness meetings will travel to the site, hold the meeting, and travel back the following day.

- Work week will not exceed 40 hours per week. No stand-down time is assumed for weather, natural disasters, federal holidays, or denied access to any areas (e.g., no right-of-entry).

- Mobilization/demobilization cost (unless otherwise noted) assumes round-trip air transportation between the East Coast and Kona, Hawai'i, and travel-related labor, per diem, and rental vehicles for the USACE contractor representative.

- Project management personnel include (but are not limited to) the following: on-site project manager, senior UXO supervisor, site safety officer, site quality control officer, project geophysicist, and public affairs representative(s). Project management personnel will be routed through Honolulu as part of mobilization/demobilization activities. This will allow for a project strategy planning meeting prior to mobilization and a post project briefing of the results of the response action with USACE, Honolulu District, project personnel.

- Coordination between the project team leaders and property owners shall be sufficient to allow unlimited access to each area at the time that the work in that area is scheduled to be performed.

- Cost for equipment assumes no Government-Furnished Equipment (GFE).

- Costs for stand-down time have not been estimated due to the discovery of a threatened or endangered species or significant cultural resources.

- Per Diem is based upon the rates established in the revised edition of the Joint Travel Regulations as of 01 August 2001 for the Island of Hawai'i.

- Recurring reviews will be performed to evaluate the effectiveness and reliability of the implemented OE response actions as a result of the EE/CA. The reviews will include a site inspection and interviews with local agencies (e.g., police department) and community groups.

- The costs for four recurring reviews (one review every 5 years) have been provided, covering approximately a 20-year period (Table H-12). However, as stated in Chapter 10, the USACE, Honolulu District; regulators; and local stakeholders will determine the need for recurring reviews.

- The need for construction support is based on the *County of Hawai'i General Plan's* growth projected to occur through the year 2020.

- Construction support will include, but not be limited to, the following: conducting a visual investigation of a specific property in advance of any ground disturbance activities, the on-site monitoring of subsurface excavation activities, and/or providing on-call services for the detection and disposal of OE.

- The need for construction support is based on requiring one day of construction support for every 5 acres of ground disturbance and mobilization/demobilization costs incurred for every two working weeks in the field (i.e., every 50 acres of ground disturbed). The estimated percentage of ground disturbance is based on the various land uses identified for the former maneuver area, as provided by the *County of Hawai'i General Plan* and shown in Figure 5-5 (Chapter 5.0). As shown in Table H-1, there are potentially 26,020 acres that may require construction support. Assuming 1 day of construction support for every 5 acres yields a total of 5,204 days estimated for construction support activities. Assuming that every 2 weeks (5 work days per week) over a period of 5,204 days one mobilization/demobilization is required, there would be a total of 521 mobilizations/demobilizations. This estimated number of mobilizations/demobilizations is used in Table H-22 to estimate construction support costs through the year 2020. Also included in the daily cost for construction support (Table H-13) is the cost for the initial investigation of a specific property prior to the movement of construction machinery and crews into an area.

Table H-1. Construction Support - Estimated Percentage and Acreage of Land to be Disturbed/Developed

Land Use	Estimated Acreage	Percentage to be Disturbed/Developed	Affected Acreage	Construction Support Days
Extensive Agriculture	54,000	15%	8,100	1,620
Intensive Agriculture	35,000	15%	5,250	1,050
Industrial	1,500	60%	900	180
Low Density Urban	3,000	30%	900	180
Medium Density Urban	800	45%	360	72
Open Space	10,000	15%	1,500	300
Rural	1,700	30%	510	102
Urban Development	17,000	50%	8,500	1,700
TOTAL	**123,000**	**--**	**26,020**	**5,204**

Note: The need for construction support is based on the *County of Hawai'i General Plan's* growth projected to occur through the year 2020.

Table H-2 shows the costing assumptions for various types of institutional controls that can be implemented in each evaluation area (Chapter 8.0) at the Former Waikoloa Maneuver Area and Nansay Sites. The number of warning signs for each area is based on the distance around the perimeter of each evaluation area, the amount of existing fencing, the number of major access points, and a 75-percent sign replacement rate.

Table H-2. Costing Assumptions for Various Types of Institutional Controls

OERIA Evaluation Area	Display Cases	Area Perimeter (linear feet)	Estimated Existing Fencing (linear feet)	Warning Signs on Fences[a]	Warning Signs on Posts[b]	Replacement Signs[c]	Total Warning Signs
Group I (open areas, conservation areas, extensive agricultural areas)							
Area A	--	163,400	32,000	64	263	246	573
Area B	--	21,100	--	--	42	32	74
Area C	--	126,000	55,000	110	142	189	441
Area D	--	109,300	50,000	100	119	165	384
Area E	--	120,500	14,000	28	213	181	422
Area F	--	94,600	64,000	128	93	166	387
Group II (agricultural districts)							
Area G	--	137,100	84,000	168	106	206	480
Area H	--	80,900	48,000	96	66	122	284
Area I	--	75,600	34,000	68	83	114	265
Area J	1	64,700	55,000	110	20	98	228
Area K	--	105,000	41,000	82	128	158	368
Group III (commercial, residential, industrial, rural, and resort areas)							
Area L	--	56,100	--	--	112	84	196
Area M	--	68,600	4,000	8	129	103	240
Area N	--	35,800	--	--	72	54	126
Area O	--	18,900	4,000	8	30	29	67
Area P	1	71,500	28,000	56	87	108	251
Area Q	1	50,100	40,000	80	20	75	175
Area R	--	18,800	16,000	32	6	29	67
Area S	--	93,900	93,900	188	10	149	347
Area T	--	50,600	48,000	96	53	112	261
TOTAL	**3**	**1,562,500**	**710,900**	**1,422**	**1,794**	**2,420**	**5,636**

Notes: (a) Warning signs to be placed on existing fences every 500 linear feet. Also includes fences along major roads that may dissect an evaluation area.
(b) Warning signs on posts to be placed every 500 linear feet, plus at each major access point into an evaluation area
(c) Estimated that 75 percent of all warning signs will require replacement within the first 5 years due to vandalism and/or exposure to the elements.
OERIA = Ordnance and Explosives Risk Impact Assessment

The production estimates for implementation of Institutional Controls include:

Display case installation/set-up:	2 cases per day
Warning sign on fence installation:	25 signs per day
Warning sign with post installation:	21 signs on posts per day
Distribution of informational pamphlets:	250 pamphlets per day
Landowner notification letters:	500 letters mailed per day
Community awareness meetings:	6 meetings per year for 5 years (30 total)
OE safety awareness training video:	12 days taping (14 days total including travel)
Construction support:	5 acres per day

Each task includes the following field personnel, as shown in Table H-3:

Table H-3. Field Personnel Required for Institutional Controls

Project Personnel	Display Cases	Warning Signs on Existing Fences	Warning Signs on Posts	Distribution of Informational Pamphlets	Landowner Notification Letters[a]	Community Awareness Meetings	OE Safety Awareness Training Video
USACE Contractor Personnel	2	1	--	1	2	1	1
UXO Technician	1	--	1	--	--	--	--
Video Camera Operator[b]	--	--	--	--	--	1	1
Foreman[b]	--	1	1	--	--	--	--
Laborer[b]	2	1	2	2	--	--	1

Notes: (a) Letters will be shipped via United States certified mail. Field personnel are not required.
(b) Local labor.
OE = ordnance and explosives
USACE = U.S. Army Corps of Engineers
UXO = unexploded ordnance

Table H-4 shows the number of working days required to install the number of display cases, warning signs on existing fences, and warning signs on posts, using the production rates shown on the previous page. The number of calendar days identifies the number of per diem days required to complete a specific task for personnel traveling to the site from Oahu or the United States mainland. The OE safety awareness training video would require 1 day to travel to the site, 12 working days of taping, and 1 day for return travel (14 calendar days).

Table H-4. Working Days Required for Various Types of Institutional Controls

OERIA Evaluation Area	Display Cases	Warning Signs on Fences	Warning Signs on Posts
Group I (open areas, conservation areas, extensive agricultural areas)			
Area A	-	2.6 (3)	12.5 (22)
Area B	-	-	2.0 (2)
Area C	-	4.4 (8)	6.8 (10)
Area D	-	4.0 (4)	5.7 (9)
Area E	-	1.1 (2)	10.1 (17)
Area F	-	5.1 (9)	4.4 (8)
Group II (agricultural districts)			
Area G	-	6.7 (10)	5.0 (8)
Area H	-	3.8 (4)	3.1 (4)
Area I	-	2.7 (3)	4.0 (4)
Area J	0.5 (1)	4.4 (8)	1.0 (1)
Area K	-	3.3 (4)	6.1 (10)
Group III (commercial, residential, industrial, rural, and resort areas)			
Area L	-	-	5.3 (9)
Area M	-	0.3 (1)	6.1 (10)
Area N	-	-	3.4 (4)
Area O	-	0.3 (1)	1.4 (2)
Area P	0.5 (1)	2.2 (3)	4.1 (8)
Area Q	0.5 (1)	3.2 (4)	1.0 (1)
Area R	-	1.3 (2)	0.3 (1)
Area S	-	7.5 (11)	0.5 (1)
Area T	-	3.8 (4)	2.5 (3)
TOTAL	**1.5 (2)**	**56.7 (99)**	**85.3 (149)**

Note: (1) = number of calendar days. Calendar days are calculated by allowing 7 calendar days for every 4 days worked (i.e., work week). Any working days remaining under 4 would be rounded up to the nearest day. For example, 10.3 working days is equal to 2 work weeks (8 work days), equal to 2 full calendar weeks (14 days). The remaining 2.3 days would be rounded up to 3 additional calendar days; therefore, 17 calendar days (14 + 3 = 17) would be required to complete the task estimated to take 10.3 workdays.
OERIA = Ordnance and Explosives Risk Impact Assessment

Table H-5 shows the estimated cost for the placement of warning signs on existing fences at the Former Waikoloa Maneuver Area and Nansay Sites. These costs include a 2-day stay-over in Honolulu to meet with USACE personnel regarding project directives. The costs provided do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.

Table H-5. Installation of Warning Signs on Existing Fences

Event	Unit Cost	Unit	Quantity	Total Cost
Mobilization/Demobilization	$1,500	Each	1	$1,500
Vehicle Rental (small 4x4)	$75	Day	101	$7,575
Fuel	$30	Day	101	$3,030
UXO Technician - Labor	$420	Day	59	$24,780
UXO Technician - Equipment	$20	Day	99	$1,980
UXO Technician - Per Diem (per person)	$143	Day	101	$14,443
Local Labor - Foreman	$300	Day	57	$17,100
Local Labor - Laborer	$200	Day	57	$11,400
Sign Installation Equipment	$36	Day	99	$3,564
Warning Sign Materials[(a)]	$60	Each	2,489	$149,340
TOTAL[(b)]				**$234,712**

Notes: (a) Includes warning signs on existing fencing from Table H-2 and replacement signs. Only the material cost for the replacement signs is included in this cost estimate.
(b) Costs do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.
UXO = Unexploded Ordnance

Table H-6 shows the estimated cost for the installation of warning signs on posts at the Former Waikoloa Maneuver Area and Nansay Sites. These costs include a 2-day stay-over in Honolulu to meet with USACE personnel regarding project directives. The costs provided do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.

Table H-6. Installation of Warning Signs on Posts

Event	Unit Cost	Unit	Quantity	Total Cost
Mobilization/Demobilization	$1,500	Each	1	$1,500
Vehicle Rental (large 4x4)	$100	Day	151	$15,100
Fuel	$30	Day	151	$4,530
UXO Technician - Labor	$420	Day	88	$36,960
UXO Technician - Equipment	$115	Day	149	$17,135
UXO Technician - Per Diem (per person)	$143	Day	151	$21,593
Local Labor - Foreman	$300	Day	86	$25,800
Local Labor - Laborer (2 laborers)	$400	Day	86	$34,400
Sign Installation Equipment	$160	Day	149	$23,840
Warning Sign Materials[(a)]	$90	Each	3,140	$282,600
TOTAL[(b)]				**$463,458**

Notes: (a) Includes warning signs on posts from Table H-2 and replacement signs. Only the material cost for the replacement signs is included in this cost estimate.
(b) Costs do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.
UXO = unexploded ordnance

Table H-7 shows the estimated cost for implementation of community awareness meetings at the Former Waikoloa Maneuver Area and Nansay Sites, which would be held every other month. The costs provided do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.

Table H-7. Community Awareness Meetings (30 Meetings)

Event	Unit Cost	Unit	Quantity	Total Cost
Mobilization/Demobilization - Mainland	$1,500	Each	30	$45,000
Mobilization/Demobilization - Interisland	$200	Each	30	$6,000
Development of Briefing Materials - Labor	$2,000	Each	30	$60,000
USACE Contractor - Labor	$650	Day	30	$19,500
USACE Contractor - Per Diem	$143	Person (day)	30	$4,290
Videotaping Services - Labor	$500	Each	30	$15,000
Vehicle Rental (small 4x4)[(a)]	$75	Vehicle (day)	120	$9,000
Fuel	$30	Day	30	$900
TOTAL[(b)]				**$159,690**

Notes: (a) Assumes 2 rental vehicles over a 2-day period for each meeting.
(b) Costs do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.
USACE = U.S. Army Corps of Engineers

Table H-8 shows the estimated cost for development of an OE safety awareness training video for the Former Waikoloa Maneuver Area and Nansay Sites. These costs include a 2-day stay-over in Honolulu to meet with USACE personnel regarding project directives. The costs provided do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.

Table H-8. Development of OE Safety Awareness Training Video

Event	Unit Cost	Unit	Quantity	Total Cost
Mobilization/Demobilization - Mainland	$1,500	Each	1	$1,500
Mobilization/Demobilization - Interisland	$200	Each	1	$200
Project Planning - Labor	$500	Day	30	$15,000
Script Development - Labor	$1,000	Day	30	$30,000
Video Camera Equipment Rental	$250	Day	14	$3,500
Video Camera Operator	$1,000	Day	14	$14,000
USACE Contractor (Narrator) - Labor	$650	Day	14	$9,100
USACE Contractor - Per Diem	$143	Person (day)	14	$2,002
Local Labor - Laborer	$200	Day	14	$2,800
Film Editing	$3,000	Each	1	$3,000
Tape Duplication	$50	Each	500	$25,000
Vehicle Rental (small 4x4)	$75	Day	14	$1,050
Fuel	$30	Day	14	$420
TOTAL[(a)]				**$107,572**

Note: (a) Costs do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.
USACE = U.S. Army Corps of Engineers

Table H-9 shows the estimated cost for development and distribution of informational pamphlets at the Former Waikoloa Maneuver Area and Nansay Sites. These costs include a 2-day stay-over in Honolulu to meet with USACE personnel regarding project directives. The costs provided do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.

Table H-9. Development and Distribution of Informational Pamphlets

Event	Unit Cost	Unit	Quantity	Total Cost
Artistic Development of Pamphlets - Labor	$15,000	Each	1	$15,000
Development and Review of Letter - Labor	$400	Day	14	$5,600
Reproduction/Folding of Pamphlets (weather-proof)	$3.00	Each	25,000[a]	$75,000
Mobilization/Demobilization - Mainland	$1,500	Each	1	$1,500
Vehicle Rental (small 4x4)	$75	Day	22	$1,650
Fuel	$30	Day	22	$660
USACE Contractor - Labor	$650	Day	22	$14,300
USACE Contractor - Per Diem	$143	Person (day)	22	$3,146
Local Labor - Laborer (2 laborers)	$400	Day	20	$8,000
TOTAL[b]				**$124,856**

Notes: (a) Assumes that 20,000 informational pamphlets will be distributed equally to three display case locations (1 day) and that the remaining 5,000 informational pamphlets will be distributed to local residents/businesses in areas of concern at a rate of 250 informational pamphlets a day (20 days).
(b) Costs do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.
USACE = U.S. Army Corps of Engineers

Table H-10 shows the estimated cost for the development and installation of three display cases at the Former Waikoloa Maneuver Area and Nansay Sites. These costs include a 2-day stay-over in Honolulu to meet with USACE personnel regarding project directives. The costs provided do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.

Table H-10. Development and Installation of Display Cases

Event	Unit Cost	Unit	Quantity	Total Cost
Mobilization/Demobilization	$1,500	Each	1	$1,500
Development of Display Case Material[a]	$25,000	Each	3	$75,000
Vehicle Rental (large 4x4)	$100	Day	5	$500
Fuel	$30	Day	5	$150
UXO Technician - Labor	$420	Day	5	$2,100
UXO Technician - Equipment	$50	Day	3	$150
UXO Technician - Per Diem	$143	Person (day)	5	$715
Local labor - Laborer (2 laborers)	$400	Day	2	$800
Display Case Installation Equipment	$100	Day	2	$200
TOTAL[b]				**$81,115**

Notes: (a) Includes estimated costs for labor and materials to design display posters and construct display cases.
(b) Costs do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.
UXO = unexploded ordnance

Table H-11 shows the estimated cost for development and distribution of notification letters to landowners within the Former Waikoloa Maneuver Area and Nansay Sites. The costs provided do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.

Table H-11. Costs for Development and Distribution of Notification Letters to Landowners

Event	Unit Cost	Unit	Quantity	Total Cost
Landowner Identification - Labor	$650	Day	60	$39,000
Development of Notification Letter - Labor	$150	Day	30	$4,500
Review of Notification Letter - Labor	$400	Day	10	$4,000
Reproduction of 9,000 Letters	$1.00	Each	9,000	$9,000
Packaging and Addressing 9,000 Letters - Labor	$400	Day	18	$7,200
Shipping via U.S. Certified Mail	$2.10	Each	9,000	$18,900
TOTAL[(a)]				**$82,600**

Note: (a) Costs do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.

Table H-12 shows the average cost to conduct a Recurring Review of the Former Waikoloa Maneuver Area and Nansay Sites. Each recurring review will consist of an element of planning/preparation prior to the on-site visit to be conducted by six U.S. Army Engineering and Support Center, Huntsville (CEHNC) and USACE, Honolulu District, representatives and preparation of a Final Report. On-site personnel will at a minimum conduct site surveys and interview personnel associated with local law enforcement, as well as other local stakeholders to determine the effectiveness and reliability of the implemented OE response actions. The initial recurring review will be conducted 5 years after the initiation of the recommended OE response actions (as discussed in Chapter 10), with subsequent reviews conducted on an as needed basis every 5 years after that. The USACE, Honolulu District, will have the responsibility of conducting recurring reviews. Every 5 years, representatives from the USACE, Honolulu District, regulators, and local stakeholders will meet to evaluate existing site conditions and determine if another recurring review is necessary. For the purposes of this ROM cost estimate, four recurring reviews have been estimated. The costs provided do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.

Table H-12. Costs for Conducting One Recurring Review

Event	Unit Cost	Unit	Quantity	Total Cost
Review Determination Meeting	$10,000	Each	1	$10,000
Recurring Review Plan	$20,000	Each	1	$20,000
Mobilization/Demobilization[(a)]	$5,100	Each	1	$5,100
Recurring Review - Labor	$1,950	Day	30	$58,500
Recurring Review - Per Diem	$143	Day	30	$4,290
Rental Vehicle - (small 4x4)	$75	Day	30	$2,250
Fuel	$30	Day	30	$900
Miscellaneous Equipment and Support	$50	Day	30	$1,500
Final Report	$100,000	Each	1	$100,000
TOTAL[(b)]				**$202,540**

Notes: (a) Includes travel costs for three interisland and three U.S. mainland personnel.
(b) Costs do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.

Table H-13 shows the average cost per day for construction support to be implemented at the Former Waikoloa Maneuver Area and Nansay Sites. The daily cost shown in Table H-13 does not include a mobilization/demobilization cost. The mobilization/demobilization cost is estimated to be incurred for every 2 weeks of construction support (see Table H-1) and is calculated in the total cost for construction support in Table H-22.

For construction support, the cost estimate is based on requiring 1 day of construction support for every 5 acres of ground disturbance and mobilization/demobilization costs incurred for every 2 working weeks in the field (i.e., every 50 acres of ground disturbed). The estimated percentage of ground disturbance is based on the various land uses identified for the Former Waikoloa Maneuver Area and Nansay Sites, as provided by the *County of Hawai'i General Plan* and shown in Figure 5-5 (Chapter 5.0). Based on the number of days requiring construction support (as shown in Table H-1), there will be an estimated 521 mobilizations/demobilizations. The mobilization/demobilization cost shown in Table H-13 assumes the construction support crew is from the Island of Oahu. The costs provided do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.

Table H-13. Average Cost Per Day for Construction Support

Event	Unit Cost	Unit	Quantity	Total Cost
Mobilization/Demobilization - Interisland[(a)]	$200	Each	2	$400
Initial Investigation of Property - Labor[(a)]	$800	Day	2	$1,600
UXO Technician - Labor	$420	Day	2	$840
UXO Technician - Labor	$420	Day	2	$840
UXO Technician - Equipment	$50	Day	2	$100
UXO Technician - Equipment	$50	Day	2	$100
UXO Technician - Per Diem	$143	Day	2	$286
UXO Technician - Per Diem	$143	Day	2	$286
Vehicle Rental (small 4X4)	$75	Day	2	$150
Fuel	$30	Day	2	$60
TOTAL[(b)]				**$2,662**

Notes: In the event a UXO item is identified by construction support personnel, the local authorities and Explosive Ordnance Disposal (EOD) unit will be notified to dispose of the item.
(a) Mobilization/demobilization and property investigation costs are shown in the total cost for construction support in Table H-22.
(b) Costs do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.
UXO = unexploded ordnance

SURFACE CLEARANCE OF OE (ALTERNATIVE 3)

The following assumptions and subsequent cost estimates are for conducting a Surface Clearance of OE over 500 acres. This average cost per acre is used to determine ROM cost estimates for conducting a surface clearance in each of the evaluation areas (Chapter 8.0) and recommended surface clearance areas (Chapter 9.0) at the Former Waikoloa Maneuver Area and Nansay Sites. The average cost per acre assumes that 500 acres are surface cleared with each mobilization/demobilization. Additionally, the costs provided do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.

- Any surface clearance activities to be carried out within the Former Waikoloa Maneuver Area as a result of this EE/CA will be conducted under direct guidance of the USACE.

- Work week will not exceed 40 hours per week. No stand-down time is assumed for weather, natural disasters, federal holidays, denied access to any areas, or the discovery of a threatened or endangered species or significant cultural resources.

- Per Diem is based upon the rates established in the revised edition of the Joint Travel Regulations as of 01 August 2001 for the Island of Hawai'i.

- Mobilization/demobilization cost assumes project management, land surveyors, and UXO Supervisors/Technicians are not available locally and will require rental vehicles and transportation reimbursement for air travel between the East Coast and Kona, Hawai'i.

- Project management personnel include (but are not limited to) the following: on-site project manager, senior UXO supervisor, site safety officer, site quality control officer, project geophysicist, and public affairs representative(s). Project management personnel will be routed through Honolulu as part of mobilization/demobilization activities. This will allow for a project strategy planning meeting prior to mobilization and a post project briefing of the results of the response action with USACE, Honolulu District, project personnel.

- Coordination between project personnel and property owners shall be sufficient to allow unlimited access to each area at the time that the work in that area is scheduled to be performed.

- The cost estimate for Surface Clearance of OE (Alternative 3) assumes the costs for the Work Plan and the Health and Safety Plan are the same as for Subsurface Clearance of OE to Depth of Detection (Alternative 4).

- Site facilities include a site trailer, facsimile and telephone equipment and service, personal computers to track project progress, two portable toilets, and the purchase of bottled water.

- Cost for equipment assumes no GFE including vehicles and explosives for demolition purposes.

- Hand-held metal detectors will be utilized by UXO Technicians to assist in surface clearance activities.

- All recovered OE scrap and non-OE metallic scrap will be removed, collected, and recycled through a scrap dealer.

- Vegetation removal is estimated to be required in 20 percent of the acreage to be surface cleared.

- Land survey teams will establish a 200-foot by 200-foot grid system for surface clearance activities.

- Costs for Geographic Information Systems (GIS) maintenance and deliverables have been included. The GIS applications will include but not be limited to: location of recovered OE (including UXO), topography, local

infrastructure (e.g., roads and structures), property boundaries and ownership, areas surveyed, areas of sensitive habitat, and areas with cultural resources.

- If possible, recovered UXO will be safely moved away from occupied structures and will be consolidated and detonated in a remote location. Any UXO recovered that cannot be moved will be blown in place.

- Demolitions will be performed up to twice a day during surface clearance activities; therefore, a full-time demolition team consisting of a UXO Supervisor and two UXO Technicians will conduct these activities.

- Field crews will conduct clean-up activities following each demolition shot. These activities will include filling in any hole(s) resulting from the blast, removing the remains of any sand bag enclosures, and collecting any OE scrap remaining in the area.

- If necessary, noise monitoring will be conducted to ensure that safe noise levels are maintained during demolition operations in the vicinity of occupied structures. Additionally, seismic monitoring could also be conducted to preclude damaging private property.

- Field activity production rates are estimated at installing 120 200-foot by 200-foot grids per day by a 2-person land survey team and surface clearance of 21 acres per day (approximately 23 grids per day) by three 6-person surface clearance teams each under the direction of a UXO supervisor.

- The personnel to be utilized for a Surface Clearance of OE (Table H-14) include an on-site Project Manager, Site Safety Officer (SSO), Senior UXO Supervisor (SUXOS), Quality Control (QC) Specialist, one land survey team, three surface clearance teams, one demolition team, and two public affairs representatives (for coordination of road closures and evacuations). Each team includes the following personnel:

Table H-14. Personnel Required for Surface Clearance of OE

Personnel	Project Management/ QC Team	Land Survey Team	Surface Clearance Team	Demolition Team
USACE Contractor Project Manager	1	-	-	-
Site Safety Officer	1	-	-	-
QC Specialist	1	-	-	-
Public Affairs Representative[(a)]	2	-	-	-
Senior UXO Supervisor	1	-	-	-
UXO Supervisor	-	-	3	1
UXO Technician	-	1	18	2
Surveyor	-	1	-	-

Note: (a) Includes one USACE contractor representative and one local laborer.
QC = quality control
USACE = U.S. Army Corps of Engineers
UXO = unexploded ordnance

- Road closures and evacuation of local residents and business personnel are likely as a result of surface clearance activities if a UXO item is found within the minimum separation distance (MSD) for that particular UXO item, assuming the UXO item cannot be moved to a remote location for demolition. Evacuation areas can be reduced by employing engineering controls (e.g., sand bag enclosures) during demolition activities. Evacuation costs will vary depending on the number of persons (i.e., local population) affected by these activities.

- Road closure costs include project planning and direct labor (i.e., road closure costs).

- Road closures are only estimated to last approximately 30 minutes. Road closures will begin once the demolition team is ready to "cap-in." Roads will be opened once the "all clear" sounds.

- Local law enforcement special duty officers and contract security personnel will oversee road closures. Cost for these support personnel are included in the road closure costs.

- A hospitality center will be established to provide a place of shelter for personnel who are evacuated from homes and/or businesses. The hospitality center will be manned by project staff members to support residents utilizing the center and to provide project-related information including UXO demolition procedures and future evacuation activities. The center will provide refreshments, meals (if required), entertainment (magazines, television, games for children), a play area, nursery amenities, restroom facilities, communications, cots, and tables and chairs. For the purposes of this ROM estimate, the daily cost to establish and operate a hospitality center has been estimated.

- Evacuation costs will vary based on the number of residents affected by the OE response action implemented. Three different evacuation costs have been estimated based on the number of people utilizing the hospitality center. Daily evacuation costs are based on the estimated number of people that would need to be evacuated, the coordination effort that would be required to evacuate everyone, and the cost to evacuate (e.g., set up of hospitality center, mobilization of those with special medical needs, etc.). The following three cost categories were used in this ROM estimate: low (less than 50 persons evacuated @ $7,500 per day), moderate (50-250 persons evacuated @ $10,000 per day), and high (259-500 persons evacuated @ $12,500 per day). The cost of keeping the hospitality center open and staffed will be the same regardless of the number of residents evacuated. The difference in evacuation costs is due to the per capita support costs (e.g., transportation, meals, nursery/child care, and individuals with special medical needs).

- Notification of homeowners, schools, businesses, community support agencies, and other organizations affected by possible evacuations during surface clearance activities will be conducted approximately 60 days prior to initiation of the clearance activities. Written notifications will be distributed approximately 30 days and 10 days prior to the field activities to be conducted in a particular area. Twenty-four hours prior to an evacuation, project representatives will go door-to-door within the affected evacuation area to remind residents about the next day's activities and to answer any specific questions or address any specific needs. Agencies and organizations that are to be notified include (but are not limited to): local law enforcement, fire departments, the Mayor's Office, County Emergency Management Department, local media (e.g., radio, television, and newspapers), and the local Restoration Advisory Board (RAB).

- USACE representatives and/or contractor support personnel shall perform all evacuation procedures.

- Two contract full-time public affairs representatives under the direction of the USACE will coordinate evacuations and road closures. These individuals will contact persons scheduled for evacuation, maintain a project web site, make themselves available to answer other project-related questions, interact with local agencies and organizations, as well as provide news releases and interact with the local news media.

- Local police and fire departments will be notified approximately 60 days prior to commencement of field activities. These agencies will be briefed on the anticipated field and associated evacuation schedule, the specific areas/addresses to be impacted on a particular day, and the general withdrawal and relocation procedures, including site security.

- It is assumed that 24-hour notification will be provided to affected residents prior to actual evacuation. Therefore, 24-hour security of the UXO item will have to be maintained until the item is disposed of.

- A contingent of local law enforcement officers and a contracted security force will conduct security of the evacuated area.

- Residents will be evacuated from homes and businesses for approximately 2 to 4 hours, allowing enough time for the demolition team to conduct demolition activities. No overnight evacuations are anticipated.

- Evacuation costs include evacuation planning, coordination (including security of UXO item), operation of the hospitality center, transport of affected residents to and from the hospitality center, and area security.

- Surface clearance activities will be coordinated in such a manner as to minimize fiscal impacts to local businesses (if possible, surface clearance activities will be conducted during lunch time/around business hours).

- Evacuation of businesses may result from subsurface clearance activities; therefore, businesses may be eligible for compensation for earnings affected by an evacuation. Business compensation claims will be treated on a case-by-case basis and will be based on negotiations between the business owner(s) and the government. Business owners must provide all appropriate information in order to verify fiscal impacts. All types and amounts of commercial reimbursement will require approval from the Government. For the purposes of this ROM, compensation of business revenues has been estimated at an average of $18,750 per evacuation for only those areas affected (i.e., sustaining businesses). Costs associated with fiscal impacts are not included in the average cost per 500 acres shown in Table H-15; rather, they are tallied separately for each evaluation area in Table H-18.

- Impacts to business revenues are based on annual economic and population data collected for the county of Hawai‘i. Specific data, such as the gross county product, was not available; therefore, the project revenues from agriculture, construction, tourism, high tech industry, and services industries were estimated and the daily impacts to business revenues were then calculated based on a percentage of the population to be impacted by an evacuation.

Surface Clearance of OE (Alternative 3)
Average Cost Per Acre (500 Acres)
Costing Assumptions

- Clearance area:
  - Surface clearance: 500 acres
  - Land survey (grids): 545 grids (200 feet x 200 feet)

- The production estimates include:
  - Surface clearance: 21 acres per day (combined total from all 3 teams)
  - Land survey (grids): 120 grids per day (200 feet x 200 feet)

- Project personnel:

  Project management/quality control:
  - (1) On-Site Project Manager
  - (1) Site Safety Officer
  - (1) Senior UXO Supervisor
  - (1) Quality Control Specialist
  - (2) Public Affairs Representatives (to assist USACE with public affairs)

  Land survey: 1 Team
  - (1) Land Surveyor
  - (1) UXO Technician

  Surface clearance: 3 Teams
  - (3) UXO Supervisor
  - (18) UXO Technician

  Demolition: 1 Team
  - (1) UXO Supervisor
  - (2) UXO Technician

- Work days:
  - Project Management: 25 days
  - Surface clearance: 24 days (21 acres per day)
  - Land survey (grids): 5 days (120 grids per day)

- Calendar days:
  - Project Management: 43 days (not including travel)
  - Surface clearance: 39 days (not including travel)
  - Land survey (grids): 8 days (not including travel)

The average cost for 500 acres for Surface Clearance of OE (Alternative 3) is shown in Table H-15. The average cost per acre is $1,075, plus the one-time cost of $338,500. Based on these cost estimates, the total cost would be $875,916 for a Surface Clearance of OE over 500 acres.

Table H-15. Estimated Costs for Surface Clearance of OE (Average Cost Per 500 Acres)

Event	Unit Cost	Unit	Quantity	Total Cost
One Time Costs				
Project Planning/Preparation	$75,000	Each	1	$75,000
Work Plan and Safety Plans	$65,000	Each	1	$65,000
Evacuation Plan	$85,000	Each	1	$85,000
Mobilization/Demobilization	$1,500	Person	31	$46,500
Site Set-up/Take-down	$17,000	Each	1	$17,000
Final Report	$50,000	Each	1	$50,000
Total				**$338,500**
Average Cost for 500 Acres				
Field Office/Office Equipment[(b)]	$3,000	Month	2	$6,000
Project Management - Labor[(a)]	$3,900	Day	27	$105,300
Project Management - Equipment[(b)]	$180	Day	43	$7,740
Project Management - Per Diem[(a)(b)]	$143	Person (day)	282	$40,326
Land Survey - Labor[(a)]	$1,060	Team (day)	5	$5,300
Land Survey - Equipment[(b)] (Grids)	$446	Team (day)	8	$3,568
Land Survey - Per Diem[(a)(b)]	$143	Person (day)	16	$2,288
Vegetation Clearance	$250	Acre	100	$25,000
OE Surface Clearance - Labor[(a)]	$3,810	Team (day)	24	$91,440
OE Surface Clearance - Equipment[(b)]	$114	Team (day)	39	$4,446
OE Surface Clearance - Per Diem[(a)(b)]	$143	Person (day)	819	$117,117
Demolition - Labor[(a)]	$2,000	Team (day)	24	$48,000
Demolition - Equipment[(b)]	$118	Team (day)	39	$4,602
Demolition - Per Diem[(a)(b)]	$143	Person (day)	123	$17,589
Demolition Cleanup - Labor[(a)]	$200	Person (day)	24	$4,800
Vehicle Rental (large 4x4)	$600	Week	43	$25,800
Vehicle Rental (small 4x4)	$500	Week	18	$9,000
Fuel (vehicles)	$700	Week	6	$4,200
GIS Application - Labor	$500	Day	25	$12,500
GIS Deliverables	$400	Week	6	$2,400
Total				**$537,416**
TOTAL				**$875,916**

Notes: (a) Includes 2 days per person for travel to and from the project site.
(b) Determined in calendar days.
GIS = Geographic Information System
OE = ordnance and explosives

SUBSURFACE CLEARANCE OF OE TO DEPTH OF DETECTION (ALTERNATIVE 4)

The following assumptions and subsequent cost estimates are for conducting a Subsurface Clearance of OE to Depth of Detection over 500 acres. This average cost per acre is used to determine ROM cost estimates for conducting a Subsurface Clearance of OE to Depth of Detection in each of the evaluation areas (Chapter 8.0) and recommended subsurface clearance areas (Chapter 9.0) at the Former Waikoloa Maneuver Area and Nansay Sites. The average cost per acre assumes a Subsurface Clearance of OE to Depth of Detection over 500 acres with each mobilization/ demobilization. Additionally, the costs provided do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.

- Any subsurface clearance activities to be carried out within the Former Waikoloa Maneuver Area as a result of this EE/CA will be conducted under the direct guidance of the USACE.

- Work week will not exceed 40 hours per week. No stand-down time is assumed for weather, natural disasters, federal holidays, denied access to any areas, or the discovery of a threatened or endangered species or significant cultural resources.

- Per Diem is based upon the rates established in the revised edition of the Joint Travel Regulations as of 01 August 2001 for the Island of Hawai'i.

- Mobilization/demobilization cost assumes project management, land surveyors, geophysical equipment operators, SUXOS, SSO, UXO Supervisors, and UXO Technicians are not available locally and will require rental vehicles and transportation reimbursement for air travel between the East Coast and Kona, Hawai'i.

- Project management personnel include (but are not limited to) the following: On-Site Project Manager, SUXOS, SSO, Site QC Officer, project geophysicist, and public affairs representative(s). Project management personnel will be routed through Honolulu as part of mobilization/demobilization activities. This will allow for a project strategy planning meeting prior to mobilization and a post project briefing of the results of the response action with USACE, Honolulu District, project personnel.

- Coordination between project personnel and property owners shall be sufficient to allow unlimited access to each area at the time that the work in that area is scheduled to be performed.

- The cost estimate for Subsurface Clearance of OE to Depth of Detection (Alternative 4) assumes the costs for the Work Plan and the Health and Safety Plan are the same for Surface Clearance of OE (Alternative 3).

- Although a surface clearance will be required prior to geophysical mapping, no surface clearance costs are included in any of the cost estimates shown for this alternative. Surface clearance costs have been provided previously as Alternative 3 and must be added (when appropriate) to the total cost of conducting a subsurface clearance.

- Site facilities include a site trailer, facsimile and telephone equipment and service, personal computer to track project progress, two portable toilets, and the purchase of bottled water.

- Cost for equipment assumes no GFE including vehicles and explosives for demolition purposes.

- Geophysical techniques will be used to assist in subsurface anomaly investigations.

- Vegetation removal is assumed to be required in 20 percent of the acreage to be cleared.

- It is assumed all OE scrap and non-OE metallic scrap will be removed, collected, and recycled through a local scrap dealer.

- If possible, any UXO recovered that can be safely moved away from occupied structures will be consolidated and detonated at a remote location. Any UXO recovered that cannot be moved will be blown in place.

- Field crews will conduct clean-up activities following each demolition shot. These activities will include filling in any hole(s) resulting from the blast, removing the remains of any sand bag enclosures, and collecting any OE scrap remaining in the area.

- If necessary, noise monitoring will be conducted to ensure that safe noise levels are maintained during demolition operations in the vicinity of occupied structures. Additionally, seismic monitoring could also be conducted to preclude damaging private property.

- Based on the results of the Phase II EE/CA field investigation, it is assumed that 90 percent of the anomaly sources will be at depths ranging from the surface to 24 inches below ground surface. The remaining 10 percent of the anomaly sources will be at depths greater than 24 inches below ground surface.

- Demolitions will be performed up to twice a day during the Subsurface Clearance of OE to Depth of Detection; therefore, a full time demolition team consisting of a UXO Supervisor and two UXO Technicians will conduct these activities.

- Land survey teams will establish a 100-foot by 100-foot grid system in the area selected for Subsurface Clearance of OE to Depth of Detection.

- Costs associated with holiday leave/travel have not been included.

- Costs for GIS maintenance and deliverables have been included. The GIS applications will include but not be limited to: location of recovered OE (including UXO), topography, local infrastructure (e.g., roads and structures), property boundaries and ownership, areas surveyed, areas of sensitive habitat, and areas with cultural resources.

- Site security costs have not been included except for during evacuation of local residents.

- All phases of the field operations associated with the subsurface clearance will be conducted using a phased approach under one mobilization/demobilization effort.

- Field activity production rates are estimated at installing 150 100-foot by 100-foot grids per day by two 2-person survey crews, geophysical mapping 24 grids per day by three 3-person geophysical mapping crews, and reacquisition and investigation of 300 anomalies per day by six 6-person intrusive sampling teams.

- It is assumed that geophysical data analysis/processing and anomaly selection will be conducted on site.

- The personnel to be utilized for a Subsurface Clearance of OE to Depth of Detection during the anomaly investigation phase (Table H-16) include an on site Project Manager, SSO, SUXOS, QC Specialist, geophysicist, two public affairs representatives, three data analysts, two land survey teams, three geophysical mapping teams, six anomaly investigation teams, and one demolition team. Each team includes the following personnel:

Table H-16. Personnel Required for Subsurface Clearance of OE to Depth of Detection

Personnel	Project Management Team	Land Survey Team	Geophysical Mapping Team	Anomaly Investigation Team	Demolition Team
USACE Contractor Project Manager	1	-	-	-	-
Site Safety Officer	1	-	-	-	-
QC Specialist	1	-	-	-	-
Senior UXO Supervisor	1	-	-	-	-
Geophysicist	1	-	-	-	-
Public Affairs Representative[(a)]	2	-	-	-	-
UXO Supervisor	-	-	-	6	1
UXO Technician	-	2	3	30	2
Surveyor	-	2	-	-	-
EM-61 Operator	-	-	3	-	-
Laborer	-	-	3	-	-
Data Analyst	3	-	-	-	-

Note: (a) Includes one local laborer.
QC = quality control
USACE = U.S. Army Corps of Engineers
UXO = unexploded ordnance

- Road closures and evacuation of local residents and business personnel are likely as a result of subsurface clearance activities if a UXO item is found within the MSD for that particular UXO item, assuming the UXO item cannot be moved to a remote location for demolition. Evacuation areas can be reduced by employing engineering controls (e.g., sand bag enclosures) during demolition activities. Evacuation costs will vary depending on the number of persons (i.e., local population) affected by these activities.

- Road closure and evacuation costs are not included in the average cost per 500 acres shown in Table H-17; rather, the number of evacuations and road closures are estimated (depending on the size of the area, population, etc.) and tallied separately for each evaluation area in Table H-19.

- Road closure costs include project planning and direct labor (i.e., road closure costs).

- Road closures are only estimated to last approximately 30 minutes. Road closures will begin once the demolition team is ready to “cap-in.” Roads will be opened once the “all clear” sounds.

- Local law enforcement (i.e., special duty officers) and/or contract security personnel will oversee road closures. Cost for these support personnel are included in the road closure costs.

- A hospitality center will be established to provide a place of shelter for personnel who are evacuated from homes and/or businesses. The hospitality center will be manned by project staff members to support residents utilizing the center and to provide project related information including UXO demolition procedures and future evacuation activities. The center will provide refreshments, meals (if required), entertainment (magazines, television, games for children), a play area, nursery amenities, restroom facilities, communications, cots, and tables and chairs. For the purposes of this ROM estimate, the daily cost to establish and operate a hospitality center has been estimated.

- Evacuation costs include evacuation coordination (including security of recovered UXO items), operation of the hospitality center (for local residents and business personnel), transport of evacuated personnel to and from the hospitality center, and local area security.

- Evacuation costs will vary based on the number of residents affected by the OE response action implemented. Three different evacuation costs have been estimated based on the number of people utilizing the hospitality center. Daily evacuation costs are based on the estimated number of people that would need to be evacuated, the coordination effort that would be required to evacuate everyone, and the cost to evacuate (e.g., set up of hospitality center, mobilization of those with special medical needs, etc.). The following three cost categories were used in this ROM estimate: low (less than 50 persons evacuated @ $7,500 per day), moderate (50-250 persons evacuated @ $10,000 per day), and high (259-500 persons evacuated @ $12,500 per day). The cost of keeping the hospitality center open and staffed will be the same regardless of the number of residents evacuated. The difference in evacuation costs is due to the per capita support costs (e.g., transportation, meals, nursery/child care, and individuals with special medical needs).

- Notification of homeowners, schools, businesses, community support agencies, and other organizations affected by possible evacuations during surface clearance activities will be conducted approximately 60 days prior to initiation of the clearance activities. Written notifications will be distributed approximately 30 days and 10 days prior to the field activities to be conducted in a particular area. Twenty-four hours prior to an evacuation, project representatives will go door-to-door within the affected evacuation area to remind residents about the next day's activities and to answer any specific questions or address any specific needs. Agencies and organizations that are to be notified include (but are not limited to): local law enforcement, fire departments, the Mayor's Office, County Emergency Management Department, local media (e.g., radio, television, and newspapers), and the local RAB.

- USACE representatives and/or contractor support personnel shall perform all evacuation procedures.

- Two contract full-time public affairs representatives under the direction of the USACE will coordinate evacuations and road closures. These individuals will contact persons scheduled for evacuation, maintain a project web site, make themselves available to answer other project-related questions, interact with local agencies and organizations, as well as provide news releases and interact with the local news media.

- Local police and fire departments will be notified approximately 60 days prior to commencement of field activities. These agencies will be briefed on the anticipated field and associated evacuation schedule, the specific areas/addresses to be impacted on a particular day, and the general withdrawal and relocation procedures, including site security.

- It is assumed that 24-hour notification will be provided to affected residents prior to actual evacuation. Therefore, 24-hour security of the UXO item will have to be maintained until the item is disposed of.

- A contingent of local law enforcement officers and a contracted security force will conduct security of the evacuated area.

- Residents will be evacuated from homes and businesses for approximately 8 to 10 hours, long enough for the demolition team to conduct intrusive investigations and demolition activities. No overnight evacuations are anticipated.

- Evacuation of businesses may result from subsurface clearance activities; therefore, businesses may be eligible for compensation for earnings affected by an evacuation. Business compensation claims will be treated on a case-by-case basis and will be based on negotiations between the business owner(s) and the government. Business owners must provide all appropriate information in order to verify fiscal impacts. All types and amounts of commercial reimbursement will require approval from the Government. For the purposes of this ROM, compensation of business revenues has been estimated at an average of $18,750 per evacuation for only those areas affected (i.e., sustaining businesses). Costs associated with fiscal impacts are not included in the average cost per 500 acres shown in Table H-17; rather, they are tallied separately for each evaluation area in Table H-19.

- Impacts to business revenues are based on annual economic and population data collected for the county of Hawai‘i. Specific data, such as the gross county product, was not available; therefore, the project revenues from agriculture, construction, tourism, high tech industry, and services industries were estimated and the daily impacts to business revenues were then calculated based on a percentage of the population to be affected by an evacuation.

Subsurface Clearance of OE to Depth of Detection (Alternative 4)
Average Cost Per Acre (500 Acres)
Costing Assumptions

- Clearance area:
  - Subsurface Clearance: 500 acres
  - Land Survey (grids): 2,178 grids (100 feet x 100 feet)
  - Total expected anomalies: 32,670 anomalies (15 anomalies per grid)
  - Land Survey (points): 32,670 anomalies
- The production estimates include:
  - Land Survey (grids): 150 grids per day (100 feet x 100 feet)
  - Geophysical Mapping: 24 grids per day (100 feet x 100 feet)
  - Anomaly Reacquisition: 300 anomalies per day
  - Anomaly Investigation: 300 anomalies per day
- Project personnel:

  Project management:
  - (1) On-Site Project Manager
  - (1) Site Safety Officer
  - (1) Quality Control Supervisor
  - (1) Senior UXO Supervisor
  - (1) Geophysicist
  - (2) Public Affairs Representatives (to assist USACE with public affairs)
  - (3) Data Analyst

  Land survey: 2 Teams
  - (2) Land Surveyor
  - (2) UXO Technician

  Geophysical mapping: 3 Teams
  - (3) UXO Technician
  - (3) EM-61 Operator
  - (3) Laborer

  Anomaly reacquisition and investigation: 6 Teams
  - (6) UXO Supervisor
  - (36) UXO Technician

  Demolition: 1 Team
  - (1) UXO Supervisor
  - (2) UXO Technician
- Workdays:
  - Project management[(a)]: 144 days (phased approach)
  - Land survey (grids): 15 days (150 grids per day)
  - Geophysical mapping: 91 days (24 grids per day)
  - Anomaly reacquisition (points): 109 days (300 points per day)
  - Anomaly investigation: 109 days (300 anomalies per day)
- Calendar days:
  - Project management[(a)]: 249 days (phased approach)
  - Land survey (grids): 24 days (not including travel)
  - Geophysical mapping: 157 days (not including travel)
  - Anomaly reacquisition (points): 190 days (not including travel)
  - Anomaly investigation: 190 days (not including travel)

(a) Project Management teams will be on site during the entire length of the project (144 working days, 249 calendar days). Project management work days and calendar days are estimated based on a staggered approach to conducting all phases of the field activities.

The average cost per acre for 500 acres for Subsurface Clearance of OE to Depth of Detection (Alternative 4) is shown in Table H-17. The total average cost per acre is $11,256, plus the one time costs of $383,300. Based on these cost estimates, the total cost would be $6,011,100 for a Subsurface Clearance of OE to Depth of Detection over 500 acres.

Table H-17. Estimated Costs for Subsurface Clearance of OE to Depth of Detection (Average Cost Per 500 Acres)

Event	Unit Cost	Unit	Quantity	Total Cost
One Time Costs				
Project Planning/Preparation	$75,000	Each	1	$75,000
Work Plan and Safety Plans	$65,000	Each	1	$65,000
Evacuation Plan	$85,000	Each	1	$85,000
Mobilization/Demobilization	$1,500	Person	61	$91,500
Site Set-up/Take-down	$16,800	Each	1	$16,800
Final Report	$50,000	Each	1	$50,000
Total				**$383,300**
Average Cost for 500 Acres				
Field Office/Office Equipment[(b)]	$3,000	Month	8	$24,000
Project Management - Labor[(a)]	$6,500	Day	146	$949,000
Project Management - Equipment[(b)]	$1,260	Day	249	$313,740
Project Management - Per Diem[(a)(b)]	$143	Day	2,510	$358,930
Land Survey (Grids) - Labor[(a)]	$840	Team (day)	30	$25,200
Land Survey (Grids) - Equipment[(b)]	$446	Team (day)	30	$13,380
Land Survey (Grids) - Per Diem[(a)(b)]	$143	Person (day)	53	$7,579
Vegetation Clearance	$250	Acre	100	$25,000
Geophysical Mapping - Labor[(a)]	$1,250	Team (day)	273	$341,250
Geophysical Mapping - Equipment[(b)]	$454	Team (day)	471	$213,834
Anomaly Reacquisition - Labor[(a)]	$840	Team (day)	803	$674,520
Anomaly Reacquisition - Equipment[(b)]	$520	Team (day)	218	$113,360
Anomaly Reacquisition - Per Diem[(a)(b)]	$143	Person (day)	218	$31,174
Geophysical Mapping - Per Diem[(a)(b)]	$143	Person (day)	1,413	$202,059
Anomaly Investigation - Labor[(a)]	$3,030	Team (day)	327	$990,810
Anomaly Investigation - Equipment[(b)]	$296	Team (day)	570	$168,720
Anomaly Investigation - Per Diem[(a)(b)]	$143	Person (day)	3,990	$570,570
Demolition - Labor[(a)]	$1,350	Team (day)	73	$98,550
Demolition - Equipment[(b)]	$118	Team (day)	73	$8,614
Demolition - Per Diem[(a)(b)]	$143	Person (day)	570	$81,510
Demolition Cleanup - Labor	$200	Person (day)	73	$14,600
Vehicle Rental (large 4x4)	$600	Week	213	$127,800
Vehicle Rental (small 4x4)	$500	Week	180	$90,000
Fuel (vehicles)	$500	Week	36	$18,000
GIS Application - Labor	$1,000	Day	144	$144,000
GIS Deliverables	$600	Week	36	$21,600
Total				**$5,627,800**
TOTAL				**$6,011,100**

Notes: (a) Includes 2 days per person for travel to and from the project site.
(b) Determined in Calendar Days.
GIS = Geographic Information System

PART II - ESTIMATED COSTS FOR OERIA EVALUATION AREAS

The costing assumptions and estimated costs per acre calculated in Part I (Tables H-5 through H-13) of this appendix were used to develop ROM cost estimates for each of the OERIA evaluation areas (as shown in Chapter 4.0 on Figure 4-1).

For purposes of the analysis and comparison of the four OE response action alternatives, the number of road closures and evacuation days are estimated for each of the OERIA evaluation areas in Table H-18 (Surface Clearance of OE) and Table H-19 (Subsurface Clearance of OE to Depth of Detection). The number of evacuations determined for each OERIA evaluation area for the Surface Clearance of OE are based on the estimated number of UXO that may be in an area (based on the results of the Phase II EE/CA field investigation). The number of evacuations determined for each OERIA evaluation area for the Subsurface Clearance of OE to Depth of Detection are based on the number of days (i.e., production rate) that field crews will be working within the MSD (i.e., safety exclusion zone) for occupied structures. Road closure and evacuation costs shown in Tables H-18 and H-19 are associated with project planning and implementation. Evacuation costs will vary based on the number of residents evacuated and the costs associated with the use of the hospitality center. Low (less than 50 persons @ $7,500 per day), moderate (50-250 persons @ $10,000 per day), and high (259-500 persons @ $12,500 per day) evacuation costs have been estimated and are provided based on the estimated resident population to be evacuated. The cost of keeping the hospitality center open and staffed will be the same regardless of the number of residents evacuated. The difference in evacuation costs is due to the per capita support costs (e.g., transportation, meals, nursery/child care, individuals with special medical needs). Surface and subsurface clearance activities will be coordinated in such a manner as to minimize impacts to revenues to local businesses (e.g., conduct intrusive investigations and surface clearance activities, if possible, during lunch time/around business hours).

Impacts to business revenues are based on annual economic and population data collected for the county of Hawai‘i. Specific data, such as the gross county product, was not available; therefore, the project revenues from agriculture, construction, tourism, high tech industry, and services industries were estimated, and the daily impacts to business revenues were then calculated based on a percentage of the population to be affected by an evacuation. The daily impacts to business revenues has been estimated at an average of $18,750 per day, since evacuations may occur that do not impact local businesses, while other evacuations (e.g., hotels) will have an increased economic impact.

Estimated costs for Surface Clearance of OE (Alternative 3) in each OERIA evaluation area are shown in Table H-20. Estimated costs for Subsurface Clearance of OE to Depth of Detection (Alternative 4) in each OERIA evaluation area are shown in Table H-21. The estimated costs for these clearance actions utilized the average per acre cost of $1,075 (Surface Clearance of OE) and $11,256 (Subsurface Clearance of OE to Depth of Detection). The costs provided do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.

Table H-18. Estimated Number and Cost of Road Closures, Evacuation Days, and Business Losses for Surface Clearance of OE

OERIA Evaluation Area	Total Acreage	Number of Road Closures	Cost Per Road Closure	Number of Evacuations	Cost Per Evacuation	Number of Business Days Lost	Impacts to Business Revenues	Total Estimated Cost
Group I (open areas, conservation areas, extensive agricultural areas)								
Area A	15,752	4	$520	1	$7,500	1	$18,750	$28,330
Area B	518	2	$520	1	$7,500	1	$18,750	$27,290
Area C	6,438	2	$520	1	$7,500	1	$18,750	$27,290
Area D	8,519	3	$520	15	$10,000	5	$93,750	$620,310
Area E	4,140	3	$520	1	$7,500	1	$18,750	$27,810
Area F	7,982	4	$520	1	$7,500	1	$18,750	$28,330
Group II (agricultural districts)								
Area G	13,527	14	$520	2	$7,500	2	$37,500	$97,280
Area H	8,335	6	$520	2	$7,500	2	$37,500	$93,120
Area I	4,513	9	$520	2	$7,500	2	$37,500	$94,680
Area J	1,607	2	$520	2	$12,500	2	$37,500	$101,040
Area K	5,535	5	$520	1	$7,500	1	$18,750	$28,850
Group III (commercial, residential, industrial, rural, and resort areas)								
Area L	2,907	5	$520	1	$7,500	1	$18,750	$28,850
Area M	4,940	9	$520	2	$7,500	2	$37,500	$94,680
Area N	1,541	5	$520	16	$12,500	12	$225,000	$2,902,600
Area O	493	2	$520	6	$12,500	4	$75,000	$376,040
Area P	4,186	30	$520	59	$12,500	40	$750,000	$30,753,100
Area Q	1,114	6	$520	13	$12,500	8	$150,000	$1,365,620
Area R	360	6	$520	2	$7,500	2	$37,500	$93,120
Area S	86	11	$520	2	$7,500	2	$37,500	$95,720
Area T	3,791	4	$520	2	$7,500	2	$37,500	$92,080
TOTAL	**96,284**	**132**	**$68,640**	**132**	**$1,507,500**	**92**	**$35,400,000**	**$36,976,140**

OERIA = Ordnance and Explosives Risk Impact Assessment

The main areas affected by evacuations during the surface clearance include, but may not be limited to:

Area D	Wind farm employees and residents in the east portion of the area
Area N	Hapuna Prince Beach Resort
Area O	O'uli residents and construction contractors
Area P	Waikoloa Village residents and businesses
Area Q	Waimea (Kamuela) residents and businesses

Table H-19. Estimated Number and Cost of Road Closures, Evacuation Days, and Business Losses for Subsurface Clearance of OE to Depth of Detection

OERIA Evaluation Area	Total Acreage	Number of Road Closures	Cost Per Road Closure	Number of Evacuations	Cost Per Evacuation	Number of Business Days Lost	Impacts to Business Revenues	Total Estimated Cost
Group I (open areas, conservation areas, extensive agricultural areas)								
Area A	15,752	12	$520	2	$7,500	2	$37,500	$96,240
Area B	518	6	$520	2	$7,500	2	$37,500	$93,120
Area C	6,438	6	$520	19	$7,500	4	$75,000	$445,620
Area D	8,519	9	$520	45	$10,000	15	$281,250	$4,673,430
Area E	4,140	9	$520	12	$7,500	5	$93,750	$563,430
Area F	7,982	12	$520	23	$7,500	18	$337,500	$6,253,740
Group II (agricultural districts)								
Area G	13,527	42	$520	117	$7,500	6	$112,500	$1,574,340
Area H	8,335	18	$520	12	$7,500	6	$112,500	$774,360
Area I	4,513	27	$520	2	$7,500	2	$37,500	$104,040
Area J	1,607	6	$520	12	$12,500	6	$112,500	$828,120
Area K	5,535	15	$520	12	$7,500	6	$112,500	$772,800
Group III (commercial, residential, industrial, rural, and resort areas)								
Area L	2,907	15	$520	12	$7,500	2	$37,500	$172,800
Area M	4,940	27	$520	12	$7,500	6	$112,500	$779,040
Area N	1,541	15	$520	101	$12,500	50	$937,500	$48,145,300
Area O	493	27	$520	18	$12,500	9	$168,750	$1,757,790
Area P	4,186	90	$520	182	$12,500	91	$1,706,250	$157,590,550
Area Q	1,114	18	$520	41	$12,500	28	$525,000	$15,221,860
Area R	360	18	$520	39	$7,500	39	$731,250	$28,820,610
Area S	86	33	$520	7	$7,500	2	$37,500	$144,660
Area T	3,791	12	$520	18	$7,500	9	$168,750	$1,659,990
TOTAL	**96,284**	**417**	**$216,840**	**688**	**$7,042,500**	**308**	**$263,212,500**	**$270,471,840**

OERIA = Ordnance and Explosives Risk Impact Assessment

The main areas affected by evacuations during the subsurface clearance include, but may not be limited to:

Area C	Waikoloa Village residents
Area D	Wind farm employees and residents in the east portion of the area
Area F	West Hawai‘i Concrete quarrying operations, and residents and businesses along Mamalahoa Highway
Area G	Waiki‘i Ranch residents
Area N	Hapuna Prince Beach Resort
Area O	O‘uli residents and construction contractors
Area P	Waikoloa Village residents and businesses
Area Q	Waimea (Kamuela) residents and businesses
Area R	Waimea-Kohala Airport businesses
Area T	Waikoloa Village residents and businesses

Table H-20. Estimated Costs for Surface Clearance of OE

OERIA Evaluation Area	Total Acreage	Average Cost Per Acre	Total Acreage Cost	Total One-Time Costs	Total Road Closure/ Evacuation Costs	Total Estimated Cost
Group I (open areas, conservation areas, extensive agricultural areas)						
Area A	15,752	$1,075	$16,933,400	$338,500	$28,330	$17,300,230
Area B	518	$1,075	$556,850	$338,500	$27,290	$922,640
Area C	6,438	$1,075	$6,920,850	$338,500	$27,290	$7,286,640
Area D	8,519	$1,075	$9,157,925	$338,500	$620,310	$10,116,735
Area E	4,140	$1,075	$4,450,500	$338,500	$27,810	$4,816,810
Area F	7,982	$1,075	$8,580,650	$338,500	$28,330	$8,947,480
Group II (agricultural districts)						
Area G	13,527	$1,075	$14,541,525	$338,500	$97,280	$14,977,305
Area H	8,335	$1,075	$8,960,125	$338,500	$93,120	$9,391,745
Area I	4,513	$1,075	$4,851,475	$338,500	$94,680	$5,284,655
Area J	1,607	$1,075	$1,727,525	$338,500	$101,040	$2,167,065
Area K	5,535	$1,075	$5,950,125	$338,500	$28,850	$6,317,475
Group III (commercial, residential, industrial, rural, and resort areas)						
Area L	2,907	$1,075	$3,125,025	$338,500	$28,850	$3,492,375
Area M	4,940	$1,075	$5,310,500	$338,500	$94,680	$5,743,680
Area N	1,541	$1,075	$1,656,575	$338,500	$2,902,600	$4,897,675
Area O	493	$1,075	$529,975	$338,500	$376,040	$1,244,515
Area P	4,186	$1,075	$4,499,950	$338,500	$30,753,100	$35,591,550
Area Q	1,114	$1,075	$1,197,550	$338,500	$1,365,620	$2,901,670
Area R	360	$1,075	$387,000	$338,500	$93,120	$818,620
Area S	86	$1,075	$92,450	$338,500	$95,720	$526,670
Area T	3,791	$1,075	$4,075,325	$338,500	$92,080	$4,505,905
TOTAL	**96,284**	**--**	**$103,505,300**	**$6,770,000**	**$36,976,140**	**$147,251,440**

OERIA = Ordnance and Explosives Risk Impact Assessment

Table H-21. Estimated Costs for Subsurface Clearance of OE to Depth of Detection

OERIA Evaluation Area	Total Acreage	Average Cost Per Acre	Total Acreage Cost	Total One-Time Costs	Total Road Closure/ Evacuation Costs	Total Estimated Cost
Group I (open areas, conservation areas, extensive agricultural areas)						
Area A	15,752	$11,256	$177,304,512	$383,300	$96,240	$177,784,052
Area B	518	$11,256	$5,830,608	$383,300	$93,120	$6,307,028
Area C	6,438	$11,256	$72,466,128	$383,300	$445,620	$73,295,048
Area D	8,519	$11,256	$95,889,864	$383,300	$4,673,430	$100,946,594
Area E	4,140	$11,256	$46,599,840	$383,300	$563,430	$47,546,570
Area F	7,982	$11,256	$89,845,392	$383,300	$6,253,740	$96,482,432
Group II (agricultural districts)						
Area G	13,527	$11,256	$152,259,912	$383,300	$1,574,340	$154,217,552
Area H	8,335	$11,256	$93,818,760	$383,300	$774,360	$94,976,420
Area I	4,513	$11,256	$50,798,328	$383,300	$104,040	$51,285,668
Area J	1,607	$11,256	$18,088,392	$383,300	$828,120	$19,299,812
Area K	5,535	$11,256	$62,301,960	$383,300	$772,800	$63,458,060
Group III (commercial, residential, industrial, rural, and resort areas)						
Area L	2,907	$11,256	$32,721,192	$383,300	$172,800	$33,277,292
Area M	4,940	$11,256	$55,604,640	$383,300	$779,040	$56,766,980
Area N	1,541	$11,256	$17,345,496	$383,300	$48,145,300	$65,874,096
Area O	493	$11,256	$5,549,208	$383,300	$1,757,790	$7,690,298
Area P	4,186	$11,256	$47,117,616	$383,300	$157,590,550	$205,091,466
Area Q	1,114	$11,256	$12,539,184	$383,300	$15,221,860	$28,144,344
Area R	360	$11,256	$4,052,160	$383,300	$28,820,610	$33,256,070
Area S	86	$11,256	$968,016	$383,300	$144,660	$1,495,976
Area T	3,791	$11,256	$42,671,496	$383,300	$1,659,990	$44,714,786
TOTAL	**96,284**	**--**	**$1,083,772,704**	**$7,666,000**	**$270,471,840**	**$1,361,910,544**

OERIA = Ordnance and Explosives Risk Impact Assessment

PART III - ESTIMATED COSTS FOR RECOMMENDED OE RESPONSE ACTIONS

The costing assumptions and estimated costs per acre calculated in Part I and Part II of this appendix were used to determine ROM cost estimates for each of the recommended OE response actions shown on Figure 9-1 (Chapter 9.0). Table H-22 tabulates the estimated costs from Part I (Tables H-5 through H-13) and tabulates a ROM cost estimate for the Institutional Controls that are recommended for the entire Former Waikoloa Maneuver Area and Nansay Sites. The costs provided do not include overhead labor rates, G&A costs, profit margins, state taxes, and costs associated with USACE support.

Table H-22. Estimated Costs for Recommended Institutional Controls

Institutional Controls	Unit Cost[(c)]	Unit	Quantity	Total Estimated Cost
Development and Installation of Warning Signs on Existing Fences	$94.30	Each	2,489	$234,712
Development and Installation of Warning Signs on Posts	$147.60	Each	3,140	$463,458
Development of OE Safety Awareness Training Video	$107,572	Each	1	$107,572
Development and Distribution of Informational Pamphlets	$4.99	Each	25,000	$124,856
Development and Installation of Display Cases	$27,038	Each	3	$81,115
Letter Notifications to Landowners	$9.18	Each	9,000	$82,600
Community Awareness Meetings	$5,323	Each	30	$159,690
Recurring Reviews	$202,540	Each	4	$810,160
Construction Support Total Daily Cost[(a)]	$2,662	Day	5,204	$13,853,048
Construction Support Mobilization/Demobilization Cost[(b)]	$2,000	Each	521	$1,042,000
TOTAL				**$16,959,211**

Notes:
(a) Includes daily cost for construction support over a period of 5,204 days.
(b) Cost includes a mobilization/demobilization cost of $400 to be incurred every 2 weeks for construction support and a one-time cost for each mobilization of $1,600 to identify/investigate property prior to construction support activities. For purposes of this cost analysis, it is assumed that construction support will take place over a period of 5,204 days over 1,041 weeks. Therefore, 521 mobilizations/demobilizations would be required.
(c) "Unit Cost" is based on the average cost derived from the "Total Estimated Cost." Due to rounding, "Unit Cost" multiplied by "Quantity" will not be equal to the "Total Estimated Cost." "Total Estimated Cost" was derived from Tables H-5 through H-13.
OE = ordnance and explosives

Table H-23 shows the acreages used to calculate estimated costs for the recommended OE response action areas (Chapter 9.0). For areas recommended for a surface clearance and/or subsurface clearance, estimates are made concerning the percentage of the area that is already developed. These areas (as discussed in Chapter 9.0), because they are already developed, will not be included in the clearance actions. For some of the OE response action areas, only the regions that are slated for future construction/development are recommended for a surface clearance and/or subsurface clearance.

Table H-23. Estimated Acreage for Recommended OE Response Action Areas

Recommended OE Response Action Area	Total Acreage	Estimated Percentage of Area Currently Developed[a]	Estimated Percentage for Surface Clearance[b]	Estimated Percentage for Subsurface Clearance[c]	Estimated Acreage for Surface Clearance	Estimated Acreage for Subsurface Clearance
OERIA Area O	1,127	15%	85%	85%	958	958
OERIA Area P	4,507	25%	75%	75%	3,380	3,380
OERIA Areas J, Q, and R	3,659	15%	85%	85%	3,110	3,110
OERIA Area D	8,130	2%	98%	98%	7,967	7,967
OERIA Areas B and N	1,896	5%	95%	95%	1,801	1,801
OERIA Area M	4,972	1%	50%	--[d]	2,486	--[d]
OERIA Area L	3,080	1%	30%	--[d]	924	--[d]
OERIA Area T	3,824	5%	95%	35%	3,633	1,338
OERIA Areas A, C, E, and I	14,332	2%	10%	5%	1,433	717
OERIA Area K	2,262	2%	98%	--[d]	2,217	--[d]
OERIA Area S	86	0%	100%	--[d]	86	--[d]

Notes:
(a) Estimated Percentage of Area Currently Developed based on information obtained during the Phase II EE/CA field investigation.
(b) Estimated Percentage for Surface Clearance is determined only for those areas where a Surface Clearance of OE has been recommended (Chapter 9.0).
(c) Estimated Percentage for Subsurface Clearance is determined only for those areas where a Subsurface Clearance of OE to Depth of Detection has been recommended (Chapter 9.0).
(d) Subsurface Clearance of OE to Depth of Detection is not recommended as an OE response action in this area.
OE = ordnance and explosives
OERIA = Ordnance and Explosives Risk Impact Assessment

Table H-24 uses the Estimated Acreage for Surface Clearance and the Estimated Acreage for Subsurface Clearance (determined in Table H-23) to calculate the total cost for the surface and subsurface clearance actions recommended in the OE response action areas (Chapter 9.0). Separating the surface and subsurface clearance costs in Table H-24 into two separate actions (two columns) allows resources to be moved in order to meet changes in priority. For example, a surface and subsurface clearance action is recommended for OERIA Area P; however, these two clearance actions may not be conducted in sequence together. Therefore, both the surface and subsurface clearance costs are listed as separate items in Table H-24.

Table H-24. Total Costs Per Acre for Recommended OE Response Action Areas

Recommended OE Response Action Area	Average Cost Per Acre (Surface Clearance)	Estimated Cost (Surface Clearance)[a]	Average Cost Per Acre (Subsurface Clearance)	Estimated Cost (Subsurface Clearance)[b]	Total Cost Surface/Subsurface Clearance
OERIA Area O	$1,075	$1,029,850	$11,256	$10,783,248	$11,813,098
OERIA Area P	$1,075	$3,633,500	$11,256	$38,045,280	$41,678,780
OERIA Areas J, Q, and R	$1,075	$3,343,250	$11,256	$35,006,160	$38,349,410
OERIA Area D	$1,075	$8,564,525	$11,256	$89,676,552	$98,241,077
OERIA Areas B and N	$1,075	$1,936,075	$11,256	$20,272,056	$22,208,131
OERIA Area M	$1,075	$2,672,450	--[c]	--[c]	$2,672,450
OERIA Area L	$1,075	$993,300	--[c]	--[c]	$993,300
OERIA Area T	$1,075	$3,905,475	$11,256	$15,060,528	$18,966,003
OERIA Areas A, C, E, and I	$1,075	$1,540,475	$11,256	$8,070,552	$9,611,027
OERIA Area K	$1,075	$2,383,275	--[c]	--[c]	$2,383,275
OERIA Area S	$1,075	$92,450	--[c]	--[c]	$92,450
TOTAL	**--**	**$30,094,625**	**--**	**$216,914,376**	**$247,009,001**

Notes: (a) Calculated using the Average Cost Per Acre (Surface Clearance) multiplied by the Estimated Acreage for Surface Clearance determined in Table H-23.
(b) Calculated using the Average Cost Per Acre (Subsurface Clearance) multiplied by the Estimated Acreage for Subsurface Clearance determined in Table H-23.
(c) Subsurface Clearance of OE to Depth of Detection is not recommended as an OE response action in this area.
OE = ordnance and explosives
OERIA = Ordnance and Explosives Risk Impact Assessment

Table H-25 provides the estimated number and cost of road closures, evacuations, and business losses that are anticipated with implementation of the recommended OE response actions (surface and subsurface clearance actions).

Table H-25. Estimated Number and Cost of Road Closures, Evacuations, and Business Losses for Recommended OE Response Action Areas

Recommended OE Response Action Area	Total Acreage	Number of Road Closures	Cost Per Road Closure	Number of Evacuations	Cost Per Evacuation	Number of Business Days Lost	Impacts to Business Revenues	Total Estimated Cost
OERIA Area O	1,127	29	$520	24	$12,500	13	$18,750	$558,830
OERIA Area P	4,507	120	$520	241	$12,500	131	$18,750	$5,531,150
OERIA Areas J, Q, and R	3,659	28	$520	120	$12,500	65	$18,750	$2,733,310
OERIA Area D	8,130	56	$520	109	$12,500	85	$18,750	$2,985,370
OERIA Areas B and N	1,896	12	$520	60	$10,000	20	$18,750	$981,240
OERIA Area M	4,972	9	$520	2	$7,500	2	$18,750	$57,180
OERIA Area L	3,080	5	$520	1	$7,500	1	$18,750	$28,850
OERIA Area T	3,824	16	$520	20	$7,500	11	$18,750	$364,570
OERIA Areas A, C, E, and I	14,332	58	$520	40	$7,500	16	$18,750	$630,160
OERIA Area K	2,262	5	$520	1	$7,500	1	$18,750	$28,850
OERIA Area S	86	11	$520	2	$7,500	2	$18,750	$58,220
TOTAL	**47,875**	**349**	**$181,480**	**620**	**$7,270,000**	**347**	**$6,506,250**	**$13,957,730**

OE = ordnance and explosives
OERIA = Ordnance and Explosives Risk Impact Assessment

Table H-26 provides the Total Estimated Cost for implementation of the recommended OE response actions (Chapter 9.0).

Table H-26. Total Estimated Costs for Recommended OE Response Actions

Recommended OE Response Action Area	Total Surface/Subsurface Clearance Costs	Total One-Time Costs	Total Road Closure/ Evacuation/Business Impact Costs	Total Estimated Cost
OERIA Area O	$11,813,098	$721,800	$558,830	$13,093,728
OERIA Area P	$41,678,780	$721,800	$5,531,150	$47,931,730
OERIA Areas J, Q, and R	$38,349,410	$721,800	$2,733,310	$41,804,520
OERIA Area D	$98,241,077	$721,800	$2,985,370	$101,948,247
OERIA Areas B and N	$22,208,131	$721,800	$981,240	$23,911,171
OERIA Area M	$2,672,450	$338,500	$57,180	$3,068,130
OERIA Area L	$993,300	$338,500	$28,850	$1,360,650
OERIA Area T	$18,966,003	$721,800	$364,570	$20,052,373
OERIA Areas A, C, E, and I	$9,611,027	$721,800	$630,160	$10,962,987
OERIA Area K	$2,383,275	$338,500	$28,850	$2,750,625
OERIA Area S	$92,450	$338,500	$58,220	$489,170
TOTAL	**$247,009,001**	**$6,406,600**	**$13,957,730**	**$267,373,331**

OE = ordnance and explosives
OERIA = Ordnance and Explosives Risk Impact Assessment

PART IV - SOLUTIONS FOR COST REDUCTIONS

Efforts can be made in advance of performing any of the recommended OE response actions (Chapter 9.0) to reduce the overall costs of implementation. The most effective way to reduce costs is to allow sufficient time for project planning prior to implementation of any of the recommended OE response actions. The following lists efforts that can be initiated to substantially reduce these costs:

- Lodging and meal (i.e., per diem) costs can be greatly reduced by constructing a trailer park type encampment, including dining and restroom facilities, on government property situated near Kawaihae harbor.

- Lodging and meal (i.e., per diem) costs can be greatly reduced if large blocks of rooms can be reserved in Kona and a group discount can be obtained. To reduce mileage and gas costs, project vehicles could be kept on the project site and field personnel could be transported to and from the hotel via a transportation bus.

- A reduction in lodging and meal (i.e., per diem) costs could be realized by utilizing the local labor force for conducting non-intrusive activities, such as surface clearance and geophysical mapping activities, thereby eliminating some of the costs associated with per diem.

- A reduction in lodging and meal (i.e., per diem) costs could be realized by utilizing the local labor force from Oahu for four 10-hour days per week (40-hour work week), rather than five 8-hour days. This would allow local laborers from Oahu the opportunity to go home for a 3-day weekend, thereby reducing costs associated with lodging and per diem.

- Surface clearance activities can be conducted by National Guard troops as part of their annual training regiment.

- Demolition activities should be conducted during midday hours to reduce evacuation costs. During this time, most residents will be at work and children will be at school.

- During extended field efforts, it is more cost effective to purchase office equipment (e.g., copiers, FAX machines, printers, laptops), geophysical equipment, global positioning systems (GPS), safety equipment (heat stress monitor), and even vehicles, as well as other project-related equipment that is normally rented. Costs associated with rental over long periods of time far exceed costs to purchase these items.

- Clearance actions should be conducted concurrently in adjoining areas. This will reduce mobilization/ demobilization costs and one-time project costs (e.g., requires only one Work Plan and one Evacuation Plan).

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